Chemistry at Christmas

TELEVISION

It was with excitement that I learned that once again a chemist would be presenting the Royal Institution Christmas Lectures in 2012. Peter Wothers would oversee the creation of a living periodic table, have a Tesla coil installed in the iconic Faraday lecture theatre, and incinerate diamonds as part of this spectacular annual event.

The Royal Institution of Great Britain (the RI) has always been a rebel of sorts. Founded in 1799, they made it their mission to bring science to everyday people and not just the academic elite. Their Christmas lectures are a long-standing tradition started by Michael Faraday, and have been delighting audiences with amazing science and innovative demonstrations for almost 200 years. My personal love affair with the lectures started 15 years ago when, as an 11 year old, I watched my very first Christmas lecture, presented by physiologist Nancy Rothwell.

This year, Wothers (a teaching fellow at the University of Cambridge) became *The Modern Alchemist* — over the course of three lectures he tackled air, water and earth (with fire a regular feature throughout). It has been ten years since a chemist delivered this nationally broadcast Christmas extravaganza — Wothers did both the tradition and subject proud.

The first of the lectures, broadcast on Boxing Day, bore the title 'Air: The Elixir of Life'. The famous lecture theatre at the RI had been transformed into a medieval castle. The doors bore portcullises and the backdrop was an array of bottles filled with all manner of intriguing substances. Over the course of the hour we were taken on a weaving journey from chemistry's ancient alchemical roots to the cutting-edge research carried out today. Wothers gets off to a flying start in the opening sequence as he strides down a corridor seamlessly setting fires, showing props and creating solutions as he explains the seemingly magical powers of the alchemists.

The second lecture in the series — 'Water: The Fountain of Youth' — focused on the elements found in a glass of water. Wothers is an excellent and comfortable presenter, moving effortlessly from one topic to another. The theme, however, seems to be a little abandoned in this programme; water is used as a springboard to talk instead about hydrogen fuel, alkali metals and halogens. No less entertaining, factual or interesting, but the viewer is perhaps left wondering a little just how they end up looking at the (admittedly dramatic) reaction between fluorine and caesium.

The last in the series, 'Earth: The Philosopher's Stone' deals with the elements found in the earth, and the mythical stone required to convert base metals into gold. Here, Wothers uncovers the intertwined history of humans and the elements. We moved through the centuries, starting with ancient knives and jewellery and end up in the modern era of elemental manipulation and superconductors. Chemistry has a rich history; it was wonderful to see it brought to life on the small screen.

On the down side, I'd have to criticize the level of explanation given at some points. The crowning glory of the lecture series was a huge racing track — in the form of a Möbius strip — made from neodymium that was lowered into the theatre from the ceiling. Wothers placed a 'car' made of a superconducting material on the track and sent it whooshing round. This was certainly exciting, but there was very little explanation of what a superconductor is or does. The children were no doubt confused to hear about a 'high-temperature superconductor' that only 'works at very low temperatures'. There is a risk, especially in such fast-paced lectures, of the science taking a back seat to the spectacle — and, for me, this is a dangerous route to go down. I also have to question the use of volunteers at times — this is a common theme of these Christmas Lectures — but some demonstrations were either too complicated or Wothers seemed unwilling to hand over too much control, leaving his young companion looking slightly uncomfortable at the side.

With all that said, the three lectures were wonderfully designed and Wothers's natural passion and excitement shine through. Many experiments were selected not just for their scientific relevance, but also their visual beauty: for example, the freezing of supercooled water. The lectures also demonstrated the massive commitment by the RI to furthering science engagement with the public. It seems that no request relating to a demonstration is too big, potentially dangerous or expensive!

This year the lectures took on a new dimension with a lot of online engagement.

© PAUL WILKINSON

To whet the audience's appetite, the RI released a new video each day in December leading up to the lectures themselves, as part of their scientific advent calendar. On all three broadcast days, the lectures quickly became one of the most mentioned topics on the social networking site Twitter, while Wothers, the RI and members of the production company responded in real-time to viewers' tweets, which made the experience all the richer.

The lectures were exactly what I hoped for, a selection box of bite-sized science delivered in entertaining and occasionally explosive ways. Viewers were left with the desire to run to the nearest person to say "did you know…" or "did you see…". A great lecture always leaves you with as many questions as it does answers and Wothers's lectures are a good example — he piques our curiosity. He shows us chemistry's journey, starting from the time we first made crude metal tools through to the modern day, and how it is leading us into an exciting tomorrow.

These lectures — along with famous ones from bygone days — are all available on the RI Channel found at www.richannel.org/christmas-lectures. ❐

REVIEWED BY JAMIE GALLAGHER

Jamie Gallagher is a PhD student at the University of Glasgow and a science communicator.